

LATE MEDIEVAL AND EARLY MODERN BONE AND ANTLER WORKING IN THE VILNIUS CASTLE COMPLEX

El trabajo de hueso y cuerna en el periodo tardo medieval y moderno temprano en el complejo del castillo de Vilna

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ABSTRACT Much bone and antler working debris was found from the territory of the Vilnius Castle complex. The bone working debris is rather standardised; most common are sawn off epiphyses of metapodials. Cattle bones prevail among the working waste, metatarsals being much more numerous than metacarpals. Antler working waste is not as standardised as the bone working waste. All parts of antlers are represented in the waste, including both elk antlers and red deer antlers. Shed antlers as well as antlers of hunted animals were used. Presumably the craftsmen working in the Vilnius castles were not specialised in bone or antler working, but used several materials and were rather specialised in the types of products they made.

Key words: Medieval and Early Modern Period, Lithuania, Vilnius Castle Complex, Skeletal Materials, Bone and Antler Working.

RESUMEN Se han encontrado numerosos restos de hueso trabajado y asta en el territorio del complejo del castillo de Vilna. Los desechos de trabajo hueso son bastante estandarizados, los más comunes son las epífisis de metapodios. Los huesos de ganado prevalecen entre los desechos procedentes de la manufactura, siendo los metatarsos son mucho más numerosos que los metacarpianos. El debris del trabajo del asta no está tan estandarizado como los desechos de trabajo del hueso. Todas las partes de las astas están representadas entre los desechos, tanto de astas de alce como de astas de

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ciervo rojo. Se usaron desmogues y cornamentas de animales cazados. Es de suponer que los artesanos que trabajaban en los castillos de Vilnius no estaban especializados en el trabajo del hueso o el asta, sino que usaban varios materiales y estaban más bien especializados en el tipo de productos manufacturados.

Palabras clave: Período Tardo Medieval y Moderno Temprano, Lituania, Complejo del Castillo de Vilnius, Materiales esqueléticos, Hueso y asta trabajados.

INTRODUCTION

Vilnius Lower and Upper Castle and the Palace of the Grand Dukes of Lithuania are objects of an extraordinary importance for Lithuanian state history. Until now most of historical and archaeological studies were dedicated to investigate life, environment and events of the higher social strata. However, dwellers of various social strata, including craftsmen, lived in the castles through the centuries. Bone and antler working in the Vilnius Castle complex has been almost unexplored until recently.

A large number of bone and antler artefacts and bone working debris has been found during the investigations on the territory of the Vilnius Castle complex and the Palace of Grand Dukes of Lithuania. The Vilnius Lower and Upper Castles complex was located in the centre of present-day Vilnius, Lithuania. The territory of the Castle complex stretches on the third sandy terrace of the Neris River, approximately 200 m from the water stream near its confluence with the Vilnelė River (fig. 1).

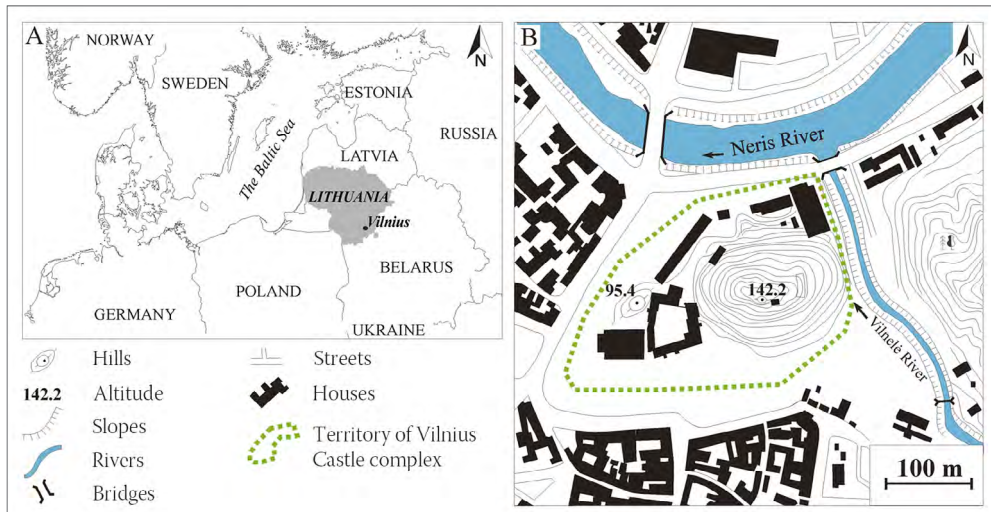


Fig. 1.—Location of the Vilnius Castle complex.

Although the earliest archaeological finds indicating human presence in the territory date back to the first millennium BC, the oldest permanent settlement was established there sometime during the 5th-8th centuries AD (Tautavičius and Urbanavičius, 1995). During the 9th-12th centuries, human activity increased within the territory of today's Vilnius Old Town, and from the onset of the 13th century Vilnius became the centre of the Lithuanian state (Kitkauskas, 1989). Vilnius Town was first mentioned in medieval documents written in 1323-1325 (Bumblauskas, 2005). The Lithuanian Grand Duke Gediminas sent letters to West European countries inviting craftsmen and tradesmen to Vilnius, which was the capital of the Lithuanian state and also an important centre of handicrafts, trade, and religion (Urbanavičius, 2003). The importance of Vilnius began to decrease in the 17th century after the town was pillaged and burned by the Russian army in 1655.

Archaeological excavations in the complex of the Vilnius Castles started in the 1930s. However, the largest comprehensive and detailed archaeological excavations started in the 1990s in the territory of Vilnius Lower Castle. 6-8-meter-thick cultural layers formed in the actively inhabited territory of the castle over the last 700 years. Because of the high ground water level, these layers preserved unique archaeological material, even usually fast decaying organic objects. Rich archaeological layers of the 13th-18th centuries permit the reconstruction of the history of everyday life, and also crafts and trade in the Castle complex (Luik *et al.*, 2018). The aim of the present article is to analyse skeletal materials used for manufacturing bone items, to give an overview of recovered artefacts and working debris, and to identify who used skeletal materials for manufacturing their products.

SKELETAL MATERIALS

We have studied bone and antler objects found from the territory of Castle complex stored in two museums: The National Museum the Palace of the Grand Dukes of Lithuania and the National Museum of Lithuania. There are altogether 1730 objects made of skeletal materials.

About one half of them are waste pieces: 820 bones and fragments. All the artefacts were not available for study (*e.g.* they were deposited in exhibitions) or it was not possible to identify the material because the item was too fragmentary or badly preserved. It was possible to identify the material of 1650 objects (fig. 2). 1260 items or fragments were bone and 340 were antler. 31 artefacts were made of ivory, most of them from elephant ivory, but some were walrus ivory. In 14 cases there are horn cores with traces of sawing. Bone artefacts and waste constitute ca 76% of identifiable skeletal items, antler objects ca 21%, ivory objects ca 2%, and horn cores less than 1%. Considering only waste, the proportion of bones is even larger — ca 85%. Antler waste constitutes ca 13% and horn cores ca 2% of waste. No artefacts made of horn have been found and horn cores are the only indication that horn was used for making artefacts.

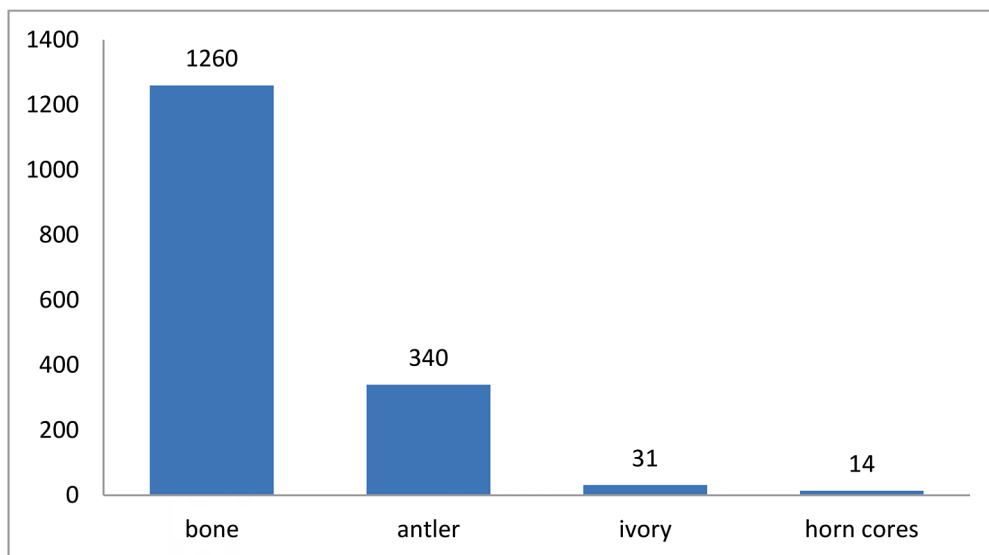


Fig. 2.—Identified materials.

Waste from ivory working has not been found and it seems that ivory items (fig. 3) were not made in Vilnius but were imported. Most ivory objects, 25 artefacts altogether, were made from elephant ivory, mostly combs (fig. 3:6-7; Luik *et al.*, 2018:190-194, table 1, fig. 2 and 3) and handles. Six artefacts were made from walrus ivory: a handle and a detail of handle, two combs and two gaming pieces (figs. 3:1, 3-5). Similar gaming pieces are known, for example, from Novgorod (Smirnova, 2001:fig. 9:5). Only one artefact made from tortoiseshell was found: a fragment of a decorative comb (fig. 3:2; Luik *et al.*, 2018:198-199, fig. 7:1).

More than 1000 objects could be identified to the species level, *i.e.* about 60% of all finds (fig. 4). Cattle (*Bos taurus*) bones were used most often. 675 cattle bones could be identified. Most common are metapodial bones, metatarsals being much more numerous than metacarpals. Horns and phalanges were also used; other cattle bones are represented with only few or single examples (*e.g.* femur head, astragalus, radius, tibia). Cattle bones were followed by skeletal parts of European elk (*Alces alces*) and caprinae, represented by 89 and 87 finds respectively. In the case of elk, mostly antlers were used, but some metapodial bones were identified also. In the case of goat (*Capra hircus*) and sheep (*Ovis aries*) the majority of identified bones were a set of 58 astragali found together from the 15th century context (Blaževičius, 2011:90, fig. 101-102). Most are goat or sheep astragali, but some could be of roe deer (*Capreolus capreolus*). Since most of these bones are burned (only two were not burned) and more or less deformed, it is not always possible to be sure of the identification. Except for this set of astragali, the most commonly used caprine bones were metatarsals. Tibiae were used also. Horse (*Equus caballus*)

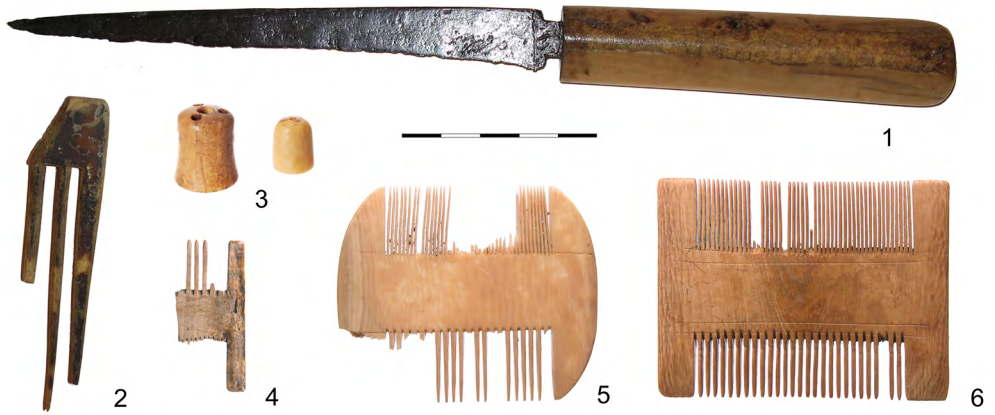


Fig. 3.—Artefacts made from ivory and tortoiseshell: a knife with walrus ivory handle (1), a decorative comb made from tortoiseshell (2), gaming pieces (3) and a comb (4) made from walrus ivory, elephant ivory combs (5-6). Photos by Vytautas Abramauskas.

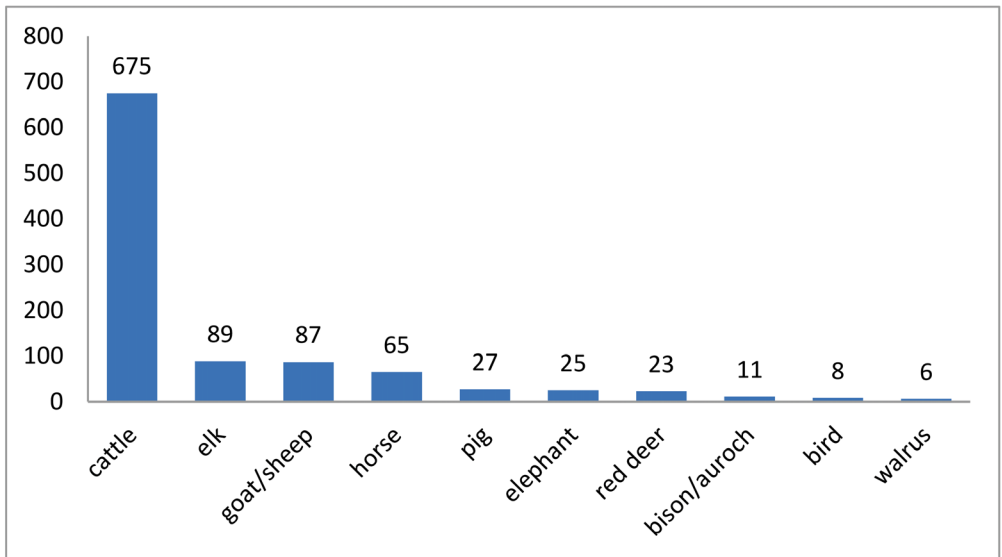


Fig. 4.—Identified species (showing the number of identified specimens).

bones were also a quite common raw material. They were identified in 65 cases; almost all are metapodials. Metatarsals are also more common than metacarpals in the case of horse bones. 25 objects are made from elephant (*Elephantidae*) ivory. Both pig (*Sus scrofa domestica*) and red deer (*Cervus elaphus*) are also represented

in about the same quantity, with ca 20-30 bones. In the case of red deer, mostly antlers were used as well as a few metapodial bones. Pig bones are represented by metapodials and fibulae. In 11 cases, bison (*Bison bonasus*) or aurochs (*Bos primigenius*) bones were identified: mostly horn cores, but also some phalanges and long bones. Worked bird bones were identified in eight cases. All are tubular bones with sawn or cut-off ends. Six objects are made from walrus (*Odobenus rosmarus*) tusks and one from turtle (*Cheloniidae*) shell. Fish bones are represented by pike (*Esox lucius*) vertebra: the hole in the center of it has been enlarged and it could have been used as a bead (e.g. Stallibrass, 2007:55-57, fig. 5.2). Two cowry shells (*Cypraeidae*) were used as pendants.

BONE WORKING DEBRIS AND BONE ARTEFACTS

Bone working debris is rather standardised. Most numerous among the waste are sawn off epiphyses of metapodial bones. Cattle bones are most common, but bones of horse, elk and red deer were also used as well as other long bones (tibia, radius) (fig. 5:1-4). Sawn-off epiphyses of metapodial bones are common finds among bone working waste both in the medieval and Early Modern towns, since most often diaphyses of long bones (fig. 5:11) were used for manufacturing artefacts (e.g. Först, 2006:201-203, fig. 3-4; Rech, 2006:310, fig. 9; Reisnert, 2006:562, fig. 12; Konczewska, 2011:306, fig. 1a). The bones were sawn either in one direction or around the bone, turning the bone during sawing (fig. 5:9). Our first idea was that the thicker bones were turned and the thinner sawn in one direction, but it is not the case. If a larger amount of waste is found at one place one of the working methods usually dominates — so it seems that the choice of sawing method depended on the habits of bone worker. Metatarsals are much more numerous than metacarpals (560 metatarsals vs 30 metacarpals of cattle). One reason for such a choice could be that the shape of the diaphysis of metatarsal bone was more suitable for turning bone artefacts (Beaudry, 2006:74; Rijkelijhuizen, 2011:112). In the case of sawn-off epiphyses, quite often the diaphysis of the bone was thinned, probably with a drawing knife (fig. 5:6-8). Presumably the diaphysis of bone was worked when the epiphyses had not been removed because it was easier to hold the bone during working. Proximal ends of metatarsals sometimes have a longitudinal hole made into the end of the bone (fig. 5:5); it was probably necessary for fixing the bone for working.

Various turned objects (fig. 6:1-3) are common among the bone artefacts from the Vilnius Castle complex. Some pieces of turning waste have been also found (fig. 6:4). Bone as well as antler was used for turning; altogether ca 120 turned objects have been found. On some turned objects the longitudinal groove characteristic of cattle metapodial bones is still partly visible (fig. 6:1). Several tubes and handles were made from turned bone, often decorated with grooves, lattice ornament and circles-and-dots.



Fig. 5.—Bone working waste: epiphyses of horse metatarsus (1), red deer metatarsus (2), cattle tibia (3), cattle metatarsals (4-6, 8) and cattle metacarpus (7), cattle metatarsus with sawing marks (9), bead making waste (10) and diaphysis of cattle metatarsus (11). Photos by Vytautas Abramauskas (9-10) and Heidi Luik (1-8, 11).

Handles of knives and forks are the most numerous artefacts made from skeletal materials in the Vilnius Castle complex: altogether 180 bone handles and details were found (fig. 6:5-8). The majority of them are made from bone — 135 specimens. Both one-piece handles for whittle tang knives (fig. 6:5) and two-pieces riveted handles for scale tang knives (fig. 6:6-7) are represented, however,



Fig. 6.—Bone artefacts: turned objects (1-3), an unfinished turned item (4), knives with bone handles (5-8), caprine astragali from the playing set (9), cattle phalanges used for playing skittles (10), fragmentary fan sticks made from ribs (11), a buzz bone (12) and needles (13) from pig bones. Photos by Vytautas Abramauskas.

knives with scale tangs are about twice as numerous as knives with whittle tangs. Scale tang knives were introduced in the 13th-14th century. Such knives were also common in the postmedieval period (MacGregor, 1985:170; Goodall, 2011:fig. 8.3; Rijkelijhuizen, 2017:2, fig. 1). Both simple as well as luxurious handles have been found, some of them decorated with incised metal wire or metal details (fig. 6:5-6; MacGregor *et al.*, 1999:1.973, fig. 928:7969, 8155; Heege, 2002:313, fig. 673). Some handles were made of slices of several materials, *e.g.* bone, metal and wood, where the latter is not preserved (fig. 6:8; MacGregor, 1985:170; Rijkelijhuizen,

2017:8). We do not know which knives and handles were made locally and which were brought from elsewhere. The knives are dated to different times, from the 13th until the 19th century.

Other common finds are cattle (and some bison/auroch) phalanges, 48 specimens altogether, used for playing skittles (fig. 6:10; Blaževičius, 2011:81-84, 194-197, table 11, fig. 88-90) and the already mentioned goat/sheep astragali (fig. 6:9; Blaževičius, 2011:90, fig. 101-102). Goat and sheep metatarsals as well as tibiae were used for making smaller handles. Two types of objects were made from pig bones: buzz bones from metapodials (fig. 6:12; Blaževičius, 2011: 69-71, fig. 66-68), and needles and awls from fibulae (fig. 6:13) (ca a dozen examples of both types have been found). Bird tubular bones were made into tubes, possibly used as needle cases or whistles (*e.g.* MacGregor *et al.*, 1999:1.977-1.978, fig. 934-935). Ribs have been used for making decorative plates and fan sticks (fig. 6:11; Luik *et al.*, 2018:199-200, fig. 7:2). It was not possible to identify the species of the ribs used for manufacturing artefacts.

A distinctive type of bone waste (fig. 5:10) comes from manufacturing rosary beads (*e.g.* Spitzers, 1999; Gróf and Gróh, 2001). 92 fragments of bead making waste have been found, and one button making waste piece, altogether about 11% of all bone working waste. In most cases cattle metatarsal bones were used. The majority of the bead making waste (87 pieces out of 92) was found from the area near the Cathedral (Kelpšaitė, 2015).

ANTLER WORKING WASTE AND ANTLER ARTEFACTS

Antler working waste is not as standardised as the bone working waste. Both elk antlers and red deer antlers were used, including shed antlers as well as antlers of hunted animals. Some elk and red deer skull fragments with sawn off antlers are among the bone working waste from the Vilnius Castles (fig. 7:1-4). Elk antlers are more numerous among the identifiable antler pieces. All parts of the antler —tines, beams, palmates, and burrs— are represented among the waste. Most working traces are sawing marks, but sometimes antlers also have traces of chopping and cutting (fig. 7:5-6). Circle-and-dot motifs on some antler pieces might be traces of testing the tool (fig. 7:7).

Antlers were used for making weapon parts, *e.g.* crossbow nuts (10 specimens) and several plates for arrow bases, and for strengthening and decorating crossbows or bows (75 plates and fragments) (fig. 8:1-2; Rackevičius, 2001). Most such plates were made from antler although some were also made from bone. In addition to crossbow plates, 85 plates were made from antler sometimes decorated with some lines, as well as with circle-and-dot motifs, zigzags, striated triangles and spirals. Antler plates were used for decorating wooden caskets, furniture, and saddles (fig. 8:6-7). Antler was used for turned artefacts. The majority of turned antler items are game pieces: 20 chessmen and 15 disc-shaped gaming pieces (fig. 8:4,8; Blaževičius, 2011:104 ff., 132 ff., table 17-20, fig. 122 ff., 159 ff.). Some antler



Fig. 7.—Antler working waste: red deer antler tine (1), burr part of shed red deer antler (2), part of elk antler crown with sawn off tines (3), skull fragment of elk with sawn off antler (4), elk antler pieces with cutting and sawing traces (5-6), elk antler with working traces and circle-and-dot motifs (7). Photos by Vytautas Abramauskas (1, 3, 5) and Heidi Luik (2, 4, 6-7).

objects are represented by a few or single specimens, *e.g.* three double combs (fig. 8:8; Luik *et al.*, 2018:180, table 1, fig. 2: 1-2), a turned inkwell decorated with grooved lines (fig. 8:5), and a large cylindrical object, decorated with zigzags and spirals (fig. 8:3). Similar antler objects, with an iron rod with a loop through the longitudinal hole, are known, for example, from Russia and dated to the 10th-12th centuries (Smirnova, 2005:fig. 1-2). They have been interpreted as bludgeons. In addition to antler specimens, metal (iron, bronze) artefacts of a similar type are also known. However, an alternative interpretation is that they may have been steelyard weights (Smirnova, 2005, and references there).

CRAFTSMEN WORKING BONE AND ANTLER

Several researchers have expressed the opinion that in earlier stages the production was based on material, but later it was rather based on types of products



Fig. 8.—Antler artefacts: support mounts for arrows (1), crossbow nuts (2), a bludgeon or a steelyard weight (3), turned chessmen (4) and an ink-well (5), decorative plates (6-7), a double comb (8), disc-shaped gaming pieces (8). Photos by Vytautas Abramauskas (2, 4-8) and Heidi Luik (1, 3).

(e.g. Christophersen, 1980:227; MacGregor, 1991:367). Presumably the craftsmen working in the Vilnius castles were not specialised in bone or antler working, but used several materials and were specialised the products they made. Craftsmen using different materials and manufacturing different products could have been

belonged to the same guilds in the Middle Ages. For example, the craftsmen who turned bone artefacts belonged to the same guild as turners who mostly worked wood in medieval Buda (Kovács, 2005:309-311). The same could be true for bead makers who made rosary beads both from bone as well as from wood and other materials (Mead, 1977:214).

Some artisans made composite artefacts from several materials (wood, iron, leather etc.), including bone and antler, for example, the knife makers, crossbow makers, and saddle makers (Kovács, 2005:309-311; Konczewska, 2011:308-309). The production process could have been organized so that several craftsmen manufactured different parts of composite artefacts from different materials, and finally a special craftsman put the parts of the product together. For example, the cutler made and sold both domestic knives and weapons with a cutting edge, but several craftsmen were needed for making knives and weapons: the blacksmith or knifsmith made the blade, the grinder sharpened the blade, the hafter made the handle and the sheather made the sheath. Finally the cutler put all parts together and sold the complete product (Goodall, 2011; Rijkelijhuizen, 2017:9). Bone and antler handles of knives and forks are one of most numerous artefact categories in the territory of the Vilnius Castles complex. Undoubtedly some of these artefacts were made locally, but others were imported as finished products. It is also possible that in some cases blades of knives were brought from elsewhere and handles for them were made locally (*e.g.* Rijkelijhuizen, 2017:11-12). A portion of handles are also turned and could have been made by turners working in the territory of the Vilnius Castle complex.

Another common artefact type in the Vilnius Castle complex was antler and bone plates used for bows and crossbows and antler crossbow nuts. Similar finds are known from the territory of the Vilnius Old Town, where traces from crossbow workshops have been found (Rackevičius, 1999). Crossbow nuts, antler and bone mounts, and working refuse have been found on two plots located in the same urban quarter. The wooden buildings where these finds were recovered have been dated from the second half of the 14th century to the first half of the 15th century. These workshops both produced new crossbows and repaired damaged examples. Their primary clients may have been the Grand Dukes residing at the Vilnius Castles (Rackevičius, 1999:182, fig. 2-4). Although the crossbow workshops at the territory of the Vilnius Old Town probably fulfilled the orders of the Grand Dukes, the finds from the Castle complex hint that crossbows were also manufactured and repaired in the territory of the Vilnius Castle complex. Manufacturing of weapons was a strategically important activity; finds that could come from production or repair of crossbows have been found from the territory of several castles (*e.g.* Ekdahl, 1998; Luik, 2015:97-100, fig. 6.6:5-7; Saunders, 2002:95; Lang, 2010:88-90, fig. 2, 8, 10-15).

Waste from making combs has not been found from the Vilnius Castle complex yet. Most combs were made from elephant ivory, which most likely was not worked in Vilnius. The combs presumably are imported goods. Elephant ivory combs could come from the Netherlands where such objects were manufactured in large quantities,

or possibly from some other region in West Europe. Antler combs presumably could originate from northwestern Russia. Perhaps walrus ivory combs could come from the towns of Russia as well, although their provenance from western areas still cannot be excluded (Luik *et al.*, 2018:203).

Simple bone tools, although not numerous, were certainly also made in the territory of the Vilnius Castle complex. Such items include several needles and points and spindle whorls made from cattle femur heads. To make these artefacts neither special tools nor particular skill was required. Most likely these tools were not made by craftsmen specialized in bone working but by their users themselves, such as the craftsmen who needed such tools, like textile workers (MacGregor *et al.*, 1999:2.005). Simple bone toys, like astragali, phalanges, and buzz bones could even have been made by children. Making of such simple artefacts does not leave much bone working waste, since usually a bone with a suitable shape was chosen. Bone and antler working waste in the territory of the Vilnius Castles complex presumably comes from the activities of specialized craftsmen and is characteristic of the organised procurement of raw materials.

CONCLUSIONS

Artefacts made from skeletal materials, as well as bone and antler working waste, are found in quite large numbers from the territory of the Vilnius Castle complex. Although bone and antler working waste is more numerous in some excavated areas, it has been found throughout the whole territory of the Vilnius Castle complex. Finds can be dated to a long period, mostly to the 13th-18th centuries. Precise dating is not always possible since many finds come from the mixed layers. Cattle bones were the most common raw material, but horse bones were used quite often. The skeletal parts of hunted animals (elk, red deer, bison, auroch) are also relatively numerous, which is not surprising since the inhabitants of the Castles of Grand Dukes of Lithuania undoubtedly had rights to hunt wild game. Antlers were used quite often, both from hunted animals and shed antler. Although artefacts made from exotic materials (ivory, tortoiseshell) are also found, waste of working such materials has not been found yet, so these items are most likely imported goods. Some artefact types are represented by a quite large number of finds, but some only with a few or single examples. Considering the waste material and unfinished items found, the artefact types certainly produced in the territory of the Castle complex were turned objects, handles, rosary beads and crossbow elements. Several imported goods made from skeletal materials are quite common on the territory of the Vilnius Castles and Palace. Certainly people with higher social status had possibility to obtain imported goods. However, there are also simple bone and antler objects, similar to bone tools found in several towns and rural sites in Lithuania. Undoubtedly various bone and antler artefacts found from the Vilnius Castle complex were used by people with different wealth and status.

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